

LOCAL GOVERNMENT WINTER MAINTENANCE CHALLENGES

PRESENTERS:

Roger Olson – Deschutes County, Oregon

Steve Jenkins – Montana LTAP

Randy Noble – Ada County Highway District (ACHD)

Steve Jenkins presented the following entertaining slide show, entitled “*Snow and Ice Control Chemicals.*”

ABRASIVES

Advantages

- Work immediately upon application
- Not temperature dependent
- Visible to the public
- Materials available locally
- Reasonable material cost
- Applied with variety of available equipment
- May be more acceptable to the public than chemicals

Stopping time on sanded packed snow at 50 mph is 50 feet less than on unsanded packed snow.
(Ref: Ontario Traction Report MAT-97-02)

Disadvantages

- Does not melt ice and snow
- Traffic reduces its effectiveness (blown off, pushed into snow)
- Covered by new snow
- Poor on hard ice
- Clogs drains and waterways
- Vehicle corrosion with salt added
- Chipped paint and broken windshields
- Dust (after storm) contributes to particulate air pollution (limit fines to reduce impact)

Application

- Rates of 500 – 1000 pounds per lane mile are common
- Volume is more important than weight
- Concentrate at critical locations:
 - Hills
 - Curves
 - Intersections
 - Railroad crossings
 - Bridges

Salt-Abrasive Mixtures

- More salt than necessary to freeze-proof abrasive
- Mixtures up to equal parts (volume) of salt and abrasive have been used

Pounds of Ice Melted Per Pound of Salt:

Temperature Degrees F.	One Pound of Salt (Sodium Chloride)
30	46.3 lbs of ice
25	14.4 lbs of ice
20	8.6 lbs of ice
15	6.3 lbs of ice
10	4.9 lbs of ice
5	4.1 lbs of ice
0	3.7 lbs of ice
-6	3.2 lbs of ice

Prewetting Salt

Prewetting salt was developed in the late 1960s.

Advantages include:

- Reduced loss of salt from bounce and scatter (saving up to 30%).
- Quick melting from wetting action.
- Some lower temperature melting from prewetting and adding chemicals.

Total Storm Management: The selection of a sequence of appropriate strategies that yield the desired level of service at the lowest total cost.

Three Steps to Winter Storm Management

- Anti-ice Early
- Managed Transition
- Modified Standard Operations

Magnesium Chloride

Uses

- Dry for deicing at lower temperatures. May be mixed with salt and often contains corrosion inhibitors.
- Apply liquid for prewetting of other materials or for anti-icing.

Characteristics

- Eutectic temperature -28°F. Effective deicing at 0°F

Magnesium Chloride actually becomes more effective (melts at lower temperature) as it dilutes down to 22% solution from higher concentrations.

DEICING/ANTI-ICING CHEMICALS

<u>Types</u>	<u>Maximum Freezing Point</u>
<u>Chemical Names</u>	<u>Depression (eutectic temperature)</u>
Salt (NaCl)	-6°F
Magnesium Chloride (MgCl ₂)	-28°F
Calcium Chloride (Ca Cl ₂)	-60°F
ICE BAN™, Caliber™	-5°F
Calcium Magnesium Acetate (CMA)	-18°F
Urea [CO(NH ₂) ₂]	11°F
Potassium Chloride (KCl)	13°F
Ethylene Glycol (CH ₂ OHCH ₂ OH)	-51°F
Potassium Acetate	-76°F
Sodium Acetate (NaAc)	-7°F

Anti-Icing

Definition

Anti-icing is a pro-active snow and ice control strategy to prevent bond formation between ice and pavement surfaces.

Use

Anti-icing is a pro-active or preventive strategy accomplished by application of a liquid chemical in small amounts before the storm begins. Anti-icing strategy is commonly used on pavements where the policy is to provide high level of service or a bare pavement policy.

Benefits

An anti-icing strategy can produce several significant benefits:

- Better pavement conditions (improved friction) can be achieved if ice formation is prevented.
- Less chemical is required to prevent the formation of ice than to remove ice after it has bonded to the pavement.
- Anti-icing applications have been reported to last for several days, particularly in preventing frost on bridge decks.

Anti-Icing

<u>USES</u>	Anti-Icing	- Prevent snow/ice from bonding to pavement.
	De-Icing	- Keep snow in plowable condition (slush).
	De-Icing	- Break up ice/packed snow.
	De-Icing	- Melt glare/black ice.
	De-Icing	- Melt snow/ice residue after plowing.

SUGGESTED POLICY

SNOW PLOWING

Districts

Each equipment operator is assigned a certain area for snow plowing during the year. When need arises, operators will assist in other areas of the County, depending on snow conditions.

School Bus Routes

School bus routes are given first priority.

Other Roads

Paved roads which are not school bus routes are given second priority. Gravel roads which are not school bus routes are given third priority. Unimproved dirt roads will be plowed upon request and as time allows.

Snow Removal for State Highway or other Jurisdiction

Contract services with providers or cooperative agreements with MDT, Cities, BLM, FWP, or other government agencies.

General Policies and Procedures

- Normal snow plowing shall be conducted during daylight hours between 6:00 am and 5:00 pm, five days per week
- Upon the discretion of the Road & Bridge Superintendent, snow plowing roads shall occur during early morning hours and/or weekends.
- The "Department" will not plow snow during high winds, unless it is an emergency.
- The "Department" will not be liable for any fence damage that occurs to fences which lie within the County's right-of-way.
- The "Department" will not be liable for any mail boxes knocked over or damaged due to snow being plowed. However, the "Department" will replace any mail boxes which are physically hit by the "Department's" snow plows.
- Paved roadways will be plowed when there is an accumulation of at least 2" of snow.
- Graveled roadways will be plowed when there is an accumulation of at least 6" of snow.
- The "Department" will sand subdivision approaches inside the County right-of-way during emergency situations only.
- When necessary, paved roads will be sanded on regular basis at major intersections, hills, curves, etc.
- Graveled roads will be sanded only in emergency situations, or at the discretion of the Road & Bridge Superintendent.

Application Rates – Magnesium Chloride

MDT Application Pre Storm Treatment

60 gal/lane mile = 1.1 ounce/yd²

Designed to handle - 3–5 inches of snow
 - 20% Moisture

Increase application if temperature is colder or more snow is expected

Application Rates - Sand

Pretreat

- Stock Pile 6-10 gal/yd³

Prewet

- As it leaves truck 6-10 gal/yd³

Training New Drivers

- Become familiar with designated snow routes.
- Become familiar with School Bus routes.
- Drive routes in summer or fall when roads are clear to become aware of hazards.
- Keep driver consistent with route when possible.
- Have new driver ride with experienced operators.
- Inform driver to get proper rest and nutrition. If driver is unable to perform safely, he should not be used.

DISCUSSION:

Roger Olson – In Oregon, politics play a large role in getting budget approved. Maintenance people are very important, most visible to public.

Randy Noble:

It is a struggle to use liquid deicer in storms.

Traffic will pack down 1"- 2" snow quickly, requiring a large amount of MgCl₂.

Complaints increasing on liquid deicer use, but no insurance pay-outs yet.

An audience member asked what size of aggregate should be used with pre-wet.

Steve Jenkins – Montana uses huge variety

Roger Olson – 5/8" size used in Deschutes County

Randy Noble – Ada County Highway District does not pre-wet with sand. Sands taken to gravel pits to dispose of – testing. Diluted MgCl₂ used on sweeper brooms.